



SEQUENCE LISTING

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Kuo, Mei-Chang
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<120> T CELL EPITOPES OF RYEGRASS POLLEN ALLERGEN

<130> IMI-040CP3

<140> 08/737,904
<141> 1996-11-20

<150> PCT/US94/09024
<151> 1994-08-05

<150> 08/106,016
<151> 1993-08-13

<160> 62

<170> PatentIn Ver. 2.0

<210> 1
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<213> Lolium perenne

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<221> sig_peptide
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Met Ala Val Gln Lys
-25

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Tyr Thr Val Ala Leu Phe Leu Ala Val Ala Leu Val Ala Gly Pro Ala
-20 -15 -10 -5

gcc tcc tac gcc gct gac gcc ggc tac acc ccc gca gcc gcg gcc acc 150
Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Thr Pro Ala Ala Ala Thr
1 5 10

ccg gct act cct gct gcc acc ccg gct gcg gct gga ggg aag gcg acg 198
Pro Ala Thr Pro Ala Ala Thr Pro Ala Ala Ala Gly Gly Lys Ala Thr
15 20 25

acc gac gag cag aag ctg ctg gag gac gtc aac gct ggc ttc aag gca 246
Thr Asp Glu Gln Lys Leu Leu Glu Asp Val Asn Ala Gly Phe Lys Ala
30 35 40

gcc gtg gcc gcc gct gcc aac gcc cct ccg gcg gac aag ttc aag atc 294
Ala Val Ala Ala Ala Asn Ala Pro Pro Ala Asp Lys Phe Lys Ile
45 50 55 60

ttc gag gcc gcc ttc gag tcc tcc aag ggc ctc ctc gcc acc tcc Phe Glu Ala Ala Phe Ser Ser Lys Gly Leu Leu Ala Thr Ser 65 70 75	342
gcc gcc aag gca ccc ggc ctc atc ccc aag ctc gac acc gcc tac gac Ala Ala Lys Ala Pro Gly Leu Ile Pro Lys Leu Asp Thr Ala Tyr Asp 80 85 90	390
gtc gcc tac aag gcc gag ggc gcc acc ccc gag gcc aag tac gac Val Ala Tyr Lys Ala Ala Glu Gly Ala Thr Pro Glu Ala Lys Tyr Asp 95 100 105	438
gcc ttc gtc act gcc ctc acc gaa gcg ctc cgc gtc atc gcc ggc gcc Ala Phe Val Thr Ala Leu Thr Glu Ala Leu Arg Val Ile Ala Gly Ala 110 115 120	486
c当地 gtc cac gcc gtc aag ccc gcc acc gag gag gtc cct gct gct Leu Glu Val His Ala Val Lys Pro Ala Thr Glu Glu Val Pro Ala Ala 125 130 135 140	534
aag atc ccc acc ggt gag ctg cag atc gtt gac aag atc gat gct gcc Lys Ile Pro Thr Gly Glu Leu Gln Ile Val Asp Lys Ile Asp Ala Ala 145 150 155	582
ttc aag atc gca gcc acc gcc aac gcc gcc ccc acc aac gat aag Phe Lys Ile Ala Ala Thr Ala Ala Asn Ala Ala Pro Thr Asn Asp Lys 160 165 170	630
ttc acc gtc ttc gag agt gcc ttc aac aag gcc ctc aat gag tgc acg Phe Thr Val Phe Glu Ser Ala Phe Asn Lys Ala Leu Asn Glu Cys Thr 175 180 185	678
ggc ggc gcc tat gag acc tac aag ttc atc ccc tcc ctc gag gcc gcg Gly Gly Ala Tyr Glu Thr Tyr Lys Phe Ile Pro Ser Leu Glu Ala Ala 190 195 200	726
gtc aag cag gcc tac gcc acc gtc gcc gcc gcg ccc gag gtc aag Val Lys Gln Ala Tyr Ala Ala Thr Val Ala Ala Ala Pro Glu Val Lys 205 210 215 220	774
tac gcc gtc ttt gag gcc gcg ctg acc aag gcc atc acc gcc atg acc Tyr Ala Val Phe Glu Ala Ala Leu Thr Lys Ala Ile Thr Ala Met Thr 225 230 235	822
cag gca cag aag gcc ggc aaa ccc gct gcc gcc gct gcc aca ggc gcc Gln Ala Gln Lys Ala Gly Lys Pro Ala Ala Ala Ala Thr Gly Ala 240 245 250	870
gca acc gtt gcc acc ggc gcc gca acc gcc gcc gcc ggt gct gcc acc Ala Thr Val Ala Thr Gly Ala Ala Thr Ala Ala Ala Gly Ala Ala Thr 255 260 265	918
gcc gct gct ggt ggc tac aaa gcc tgatcagtt gctaataac tactgaacgt Ala Ala Ala Gly Gly Tyr Lys Ala 270 275	972
atgtatgtgc atgatccggg cggcgagtgg ttttggat aattatctt cggtttcggt 1032 tcatgcagcc gcgatcgaga gggcttgcat gcttgtaata attcaatatt ttccatattct 1092 tttgaatct gttaatcccc atgacaagta gtgggatcaa gtcggcatgt atcaccgttg 1152 atgcgagttt aacgatgggg agtttatcaa agaatttatt attaaaaaaaaaaaaaaaaa 1212 aaaaaaaaaaa aaaaaaaaaa 1229	

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<213> Lolium pernne

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-5 1 5
Ala Ala Ala Ala Thr Pro Ala Thr Pro Ala Ala Thr Pro Ala Ala Ala
10 15 20
Gly Gly Lys Ala Thr Thr Asp Glu Gln Lys Leu Leu Glu Asp Val Asn
25 30 35
Ala Gly Phe Lys Ala Ala Val Ala Ala Ala Asn Ala Pro Pro Ala
40 45 50 55
Asp Lys Phe Lys Ile Phe Glu Ala Ala Phe Ser Glu Ser Ser Lys Gly
60 65 70
Leu Leu Ala Thr Ser Ala Ala Lys Ala Pro Gly Leu Ile Pro Lys Leu
75 80 85
Asp Thr Ala Tyr Asp Val Ala Tyr Lys Ala Ala Glu Gly Ala Thr Pro
90 95 100
Glu Ala Lys Tyr Asp Ala Phe Val Thr Ala Leu Thr Glu Ala Leu Arg
105 110 115
Val Ile Ala Gly Ala Leu Glu Val His Ala Val Lys Pro Ala Thr Glu
120 125 130 135
Glu Val Pro Ala Ala Lys Ile Pro Thr Gly Glu Leu Gln Ile Val Asp
140 145 150
Lys Ile Asp Ala Ala Phe Lys Ile Ala Ala Thr Ala Ala Asn Ala Ala
155 160 165
Pro Thr Asn Asp Lys Phe Thr Val Phe Glu Ser Ala Phe Asn Lys Ala
170 175 180
Leu Asn Glu Cys Thr Gly Gly Ala Tyr Glu Thr Tyr Lys Phe Ile Pro
185 190 195
Ser Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala Ala Thr Val Ala Ala
200 205 210 215
Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Ala Ala Leu Thr Lys Ala
220 225 230
Ile Thr Ala Met Thr Gln Ala Gln Lys Ala Gly Lys Pro Ala Ala Ala
235 240 245
Ala Ala Thr Gly Ala Ala Thr Val Ala Thr Gly Ala Ala Thr Ala Ala
250 255 260
Ala Gly Ala Ala Thr Ala Ala Ala Gly Gly Tyr Lys Ala
265 270 275

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<213> Lolium perenne

<220>
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<222> (7)
<223> Xaa = hydroxyproline residue

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<223> Xaa = hydroxyproline residue

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<223> Xaa = hydroxyproline residue

<220>
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<222> (20)
<223> Xaa = hydroxyproline residue

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1 5 10 15

Ala Ala Thr Xaa
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<210> 4
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<213> Lolium perenne

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<223> Xaa = hydroxyproline residue

<220>
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<220>
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<223> Xaa = hydroxyproline residue

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Ala Thr Thr Asp
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<210> 5
<211> 20
<212> PRT
<213> Lolium perenne

<220>

<400> 5
Ala Ala Ala Gly Gly Lys Ala Thr Thr Asp Glu Gln Lys Leu Leu Glu
1 5 10 15

Asp Val Asn Ala
20

<210> 6

<211> 20
<212> PRT
<213> Lolium perenne

<400> 6
Glu Gln Lys Leu Leu Glu Asp Val Asn Ala Gly Phe Lys Ala Ala Val
1 5 10 15
Ala Ala Ala Ala
20

<210> 7
<211> 20
<212> PRT
<213> Lolium perenne

<400> 7
Gly Phe Lys Ala Ala Val Ala Ala Ala Asn Ala Pro Pro Ala Asp
1 5 10 15
Lys Phe Lys Ile
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<210> 8
<211> 20
<212> PRT
<213> Lolium perenne

<400> 8
Asn Ala Pro Pro Ala Asp Lys Phe Lys Ile Phe Glu Ala Ala Phe Ser
1 5 10 15
Glu Ser Ser Lys
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<210> 9
<211> 20
<212> PRT
<213> Lolium perenne

<400> 9
Phe Glu Ala Ala Phe Ser Glu Ser Ser Lys Gly Leu Leu Ala Thr Ser
1 5 10 15
Ala Ala Lys Ala
20

<210> 10
<211> 20
<212> PRT
<213> Lolium perenne

<400> 10
Gly Leu Leu Ala Thr Ser Ala Ala Lys Ala Pro Gly Leu Ile Pro Lys
1 5 10 15
Leu Asp Thr Ala
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<210> 11
<211> 20
<212> PRT
<213> **Lolium perenne**

<400> 11
Pro Gly Leu Ile Pro Lys Leu Asp Thr Ala Tyr Asp Val Ala Tyr Lys
1 5 10 15

Ala Ala Glu Gly
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<210> 12
<211> 20
<212> PRT
<213> **Lolium perenne**

<400> 12
Tyr Asp Val Ala Tyr Lys Ala Ala Glu Gly Ala Thr Pro Glu Ala Lys
1 5 10 15

Tyr Asp Ala Phe
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<210> 13
<211> 20
<212> PRT
<213> **Lolium perenne**

<400> 13
Ala Thr Pro Glu Ala Lys Tyr Asp Ala Phe Val Thr Ala Leu Thr Glu
1 5 10 15

Ala Leu Arg Val
20

<210> 14
<211> 20
<212> PRT
<213> **Lolium perenne**

<400> 14
Val Thr Ala Leu Thr Glu Ala Leu Arg Val Ile Ala Gly Ala Leu Glu
1 5 10 15

Val His Ala Val
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<210> 15
<211> 20
<212> PRT
<213> **Lolium perenne**

<400> 15
Ile Ala Gly Ala Leu Glu Val His Ala Val Lys Pro Ala Thr Glu Glu
1 5 10 15

Val Pro Ala Ala

20

<210> 16
<211> 20
<212> PRT
<213> Lolium perenne

<400> 16
Lys Pro Ala Thr Glu Glu Val Pro Ala Ala Lys Ile Pro Thr Gly Glu
1 5 10 15
Leu Gln Ile Val
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<210> 17
<211> 20
<212> PRT
<213> Lolium perenne

<400> 17
Lys Ile Pro Thr Gly Glu Leu Gln Ile Val Asp Lys Ile Asp Ala Ala
1 5 10 15
Phe Lys Ile Ala
20

<210> 18
<211> 20
<212> PRT
<213> Lolium perenne

<400> 18
Asp Lys Ile Asp Ala Ala Phe Lys Ile Ala Ala Thr Ala Ala Asn Ala
1 5 10 15
Ala Pro Thr Asn
20

<210> 19
<211> 20
<212> PRT
<213> Lolium perenne

<400> 19
Ala Thr Ala Ala Asn Ala Ala Pro Thr Asn Asp Lys Phe Thr Val Phe
1 5 10 15
Glu Ser Ala Phe
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<210> 20
<211> 20
<212> PRT
<213> Lolium perenne

<400> 20
Asp Lys Phe Thr Val Phe Glu Ser Ala Phe Asn Lys Ala Leu Asn Glu
1 5 10 15

Cys Thr Gly Gly
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<210> 21
<211> 20
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<213> Lolium perenne

<400> 21
Asn Lys Ala Leu Asn Glu Cys Thr Gly Gly Ala Tyr Glu Thr Tyr Lys
1 5 10 15

Phe Ile Pro Ser
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<210> 22
<211> 20
<212> PRT
<213> Lolium perenne

<400> 22
Ala Tyr Glu Thr Tyr Lys Phe Ile Pro Ser Leu Glu Ala Ala Val Lys
1 5 10 15

Gln Ala Tyr Ala
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<210> 23
<211> 20
<212> PRT
<213> Lolium perenne

<400> 23
Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala Ala Thr Val Ala Ala Ala
1 5 10 15

Pro Glu Val Lys
20

<210> 24
<211> 20
<212> PRT
<213> Lolium perenne

<400> 24
Ala Thr Val Ala Ala Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Ala
1 5 10 15

Ala Leu Thr Lys
20

<210> 25
<211> 20
<212> PRT
<213> Lolium perenne

<400> 25

Tyr Ala Val Phe Glu Ala Ala Leu Thr Lys Ala Ile Thr Ala Met Thr
 1 5 10 15

Gln Ala Gln Lys
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<210> 26
 <211> 20
 <212> PRT
 <213> Lolium perenne

<400> 26
 Ala Ile Thr Ala Met Thr Gln Ala Gln Lys Ala Gly Lys Pro Ala Ala
 1 5 10 15

Ala Ala Ala Thr
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<210> 27
 <211> 20
 <212> PRT
 <213> Lolium perenne

<400> 27
 Ala Gly Lys Pro Ala Ala Ala Ala Thr Gly Ala Ala Thr Val Ala
 1 5 10 15

Thr Gly Ala Ala
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<210> 28
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 <212> PRT
 <213> Lolium perenne

<400> 28
 Gly Ala Ala Thr Val Ala Thr Gly Ala Ala Thr Ala Ala Gly Ala
 1 5 10 15

Ala Thr Ala Ala
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<210> 29
 <211> 16
 <212> PRT
 <213> Lolium perenne

<400> 29
 Thr Ala Ala Ala Gly Ala Ala Thr Ala Ala Ala Gly Gly Tyr Lys Ala
 1 5 10 15

<210> 30
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 <213> Lolium perenne

<400> 30
 Ile Ala Lys Val Pro Pro Gly Pro Asn Ile Thr Ala Glu Tyr Gly Asp

1	5	10	15
Lys Trp Leu Asp			
20			
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1	5	10	15
Lys Trp Leu Asp			
20			
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<213> Lolium perenne			
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Thr Ala Glu Tyr Gly Asp Lys Trp Leu Asp Ala Lys Ser Thr Trp Tyr			
1	5	10	15
Gly Lys Pro Thr			
20			
<210> 33			
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<400> 33			
Gly Ala Gly Pro Lys Asp Asn Gly Gly Ala Cys Gly Tyr Lys Asn Val			
1	5	10	15
Asp Lys Ala Pro			
20			
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<211> 20			
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<213> Lolium perenne			
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Gly Ala Gly Pro Lys Asp Asn Gly Gly Ala Cys Gly Tyr Lys Asp Val			
1	5	10	15

Asp Lys Ala Pro
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<210> 35
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<213> Lolium perenne

<400> 35
Cys Gly Tyr Lys Asp Val Asp Lys Ala Pro Phe Asn Gly Met Thr Gly
1 5 10 15

Cys Gly Asn Thr
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<210> 36
<211> 20
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<213> Lolium perenne

<400> 36
Phe Asn Gly Met Thr Gly Cys Gly Asn Thr Pro Ile Phe Lys Asp Gly
1 5 10 15

Arg Gly Cys Gly
20

<210> 37
<211> 20
<212> PRT
<213> Lolium perenne

<400> 37
Pro Ile Phe Lys Asp Gly Arg Gly Cys Gly Ser Cys Phe Glu Ile Lys
1 5 10 15

Cys Thr Lys Pro
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<210> 38
<211> 20
<212> PRT
<213> Lolium perenne

<400> 38
Ser Cys Phe Glu Ile Lys Cys Thr Lys Pro Glu Ser Cys Ser Gly Glu
1 5 10 15

Ala Val Thr Val
20

<210> 39
<211> 20
<212> PRT
<213> Lolium perenne

<400> 39

Glu Ser Cys Ser Gly Glu Ala Val Thr Val Thr Ile Thr Asp Asp Asn
 1 5 10 15

Glu Glu Pro Ile
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<210> 40
 <211> 20
 <212> PRT
 <213> Lolium perenne

<400> 40
 Thr Ile Thr Asp Asp Asn Glu Glu Pro Ile Ala Pro Tyr His Phe Asp
 1 5 10 15

Leu Ser Gly His
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<210> 41
 <211> 20
 <212> PRT
 <213> Lolium perenne

<400> 41
 Ala Pro Tyr His Phe Asp Leu Ser Gly His Ala Phe Gly Ser Met Ala
 1 5 10 15

Asp Asp Gly Glu
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<210> 42
 <211> 20
 <212> PRT
 <213> Lolium perenne

<400> 42
 Ala Phe Gly Ser Met Ala Asp Asp Gly Glu Glu Gln Lys Leu Arg Ser
 1 5 10 15

Ala Gly Glu Leu
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<210> 43
 <211> 20
 <212> PRT
 <213> Lolium perenne

<400> 43
 Glu Gln Lys Leu Arg Ser Ala Gly Glu Leu Glu Leu Gln Phe Arg Arg
 1 5 10 15

Val Lys Cys Lys
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<210> 44
 <211> 20
 <212> PRT
 <213> Lolium perenne

<400> 44

Glu	Leu	Gln	Phe	Arg	Arg	Val	Lys	Cys	Lys	Tyr	Pro	Asp	Asp	Thr	Lys
1			5						10					15	

Pro	Thr	Phe	His												
			20												

<210> 45

<211> 20

<212> PRT

<213> Lolium perenne

<400> 45

Tyr	Pro	Asp	Asp	Thr	Lys	Pro	Thr	Phe	His	Val	Glu	Lys	Ala	Ser	Asn
1				5					10				15		

Pro	Asn	Tyr	Leu												
			20												

<210> 46

<211> 20

<212> PRT

<213> Lolium perenne

<400> 46

Val	Glu	Lys	Ala	Ser	Asn	Pro	Asn	Tyr	Leu	Ala	Ile	Leu	Val	Lys	Tyr
1				5					10				15		

Val	Asp	Gly	Asp												
			20												

<210> 47

<211> 20

<212> PRT

<213> Lolium perenne

<400> 47

Val	Glu	Lys	Gly	Ser	Asn	Pro	Asn	Tyr	Leu	Ala	Ile	Leu	Val	Lys	Tyr
1				5					10				15		

Val	Asp	Gly	Asp												
			20												

<210> 48

<211> 20

<212> PRT

<213> Lolium perenne

<400> 48

Ala	Ile	Leu	Val	Lys	Tyr	Val	Asp	Gly	Asp	Gly	Asp	Val	Val	Ala	Val
1				5					10			15			

Asp	Ile	Lys	Glu												
			20												

<210> 49

<211> 20

<212> PRT
<213> Lolium perenne

<400> 49
Gly Asp Val Val Ala Val Asp Ile Lys Glu Lys Gly Lys Asp Lys Trp
1 5 10 15

Ile Glu Leu Lys
20

<210> 50
<211> 20
<212> PRT
<213> Lolium perenne

<400> 50
Lys Gly Lys Asp Lys Trp Ile Glu Leu Lys Glu Ser Trp Gly Ala Val
1 5 10 15

Trp Arg Ile Asp
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<210> 51
<211> 20
<212> PRT
<213> Lolium perenne

<400> 51
Thr Pro Asp Lys Leu Thr Gly Pro Phe Thr Val Arg Tyr Thr Thr Glu
1 5 10 15

Gly Gly Thr Lys
20

<210> 52
<211> 20
<212> PRT
<213> Lolium perenne

<400> 52
Val Arg Tyr Thr Thr Glu Gly Thr Lys Ser Glu Val Glu Asp Val
1 5 10 15

Ile Pro Glu Gly
20

<210> 53
<211> 20
<212> PRT
<213> Lolium perenne

<400> 53
Ser Glu Val Glu Asp Val Ile Pro Glu Gly Trp Lys Ala Asp Thr Ser
1 5 10 15

Tyr Ser Ala Lys
20

<210> 54
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<213> Lolium perenne

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<222> (7)
<223> Xaa = hydroxyproline residue

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<222> (13)
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<222> (20)
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<400> 54
Ala Asp Ala Gly Tyr Thr Xaa Ala Ala Ala Ala Ala Thr Xaa Ala Thr Xaa
1 5 10 15

Ala Ala Thr Xaa Ala Ala Ala Gly Gly Lys Ala Thr Thr Asp Glu Gln
20 25 30

Lys

<210> 55
<211> 20
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<213> Lolium perenne

<400> 55
Ala Lys Ser Thr Trp Tyr Gly Lys Pro Thr Gly Ala Gly Pro Lys Asp
1 5 10 15

Asn Gly Gly Ala
20

<210> 56
<211> 20
<212> PRT
<213> Lolium perenne

<400> 56
Glu Ser Trp Gly Ala Val Trp Arg Ile Asp Thr Pro Asp Lys Leu Thr
1 5 10 15

Gly Pro Phe Thr
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<210> 57

<211> 1181

<212> DNA

<213> Lolium perenne

<220>

<221> CDS

<222> (53)..(961)

<220>

<221> mat_peptide

<222> (125)

<400> 57

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gtg cag cag tac acg gtg gcg ctg ttc ctg gcc gtg gcc tcg tgt cgg 106
 Val Gln Gln Tyr Thr Val Ala Leu Phe Leu Ala Val Ala Ser Cys Arg
 -20 -15 -10

gcc cgc gcc tcc tac gcc gac gcc ggc tac gcc ccc gcc act ccc 154
 Ala Arg Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Ala Pro Ala Thr Pro
 -5 -1 1 5 10

gcc acc ccg gct acc ccc gcg gcc cca ggc gca gcg gtg cca gca ggg 202
 Ala Thr Pro Ala Thr Pro Ala Ala Pro Gly Ala Ala Val Pro Ala Gly
 15 20 25

aag gcg gcg acc gag gag cag aag ctg atc gag aag atc aac gcc ggc 250
 Lys Ala Ala Thr Glu Glu Gln Lys Leu Ile Glu Lys Ile Asn Ala Gly
 30 35 40

ttc aag gcc gcc gtg gcg gcc gcg ggc gtc ccg cca ggc gac aag 298
 Phe Lys Ala Ala Val Ala Ala Ala Gly Val Pro Pro Gly Asp Lys
 45 50 55

tac aag acg ttc gtc gaa acc ttc ggc aag gcc tcc aac aag gcc ttc 346
 Tyr Lys Thr Phe Val Glu Thr Phe Gly Lys Ala Ser Asn Lys Ala Phe
 60 65 70

ctg ggg gac ctc ccg acc aac tac gcc gat gtc aac tcc agg gcc cag 394
 Leu Gly Asp Leu Pro Thr Asn Tyr Ala Asp Val Asn Ser Arg Ala Gln
 75 80 85 90

ctc acc tcg aag ctc gac gcc tac aag ctc gcc tac gac gcc gcc 442
 Leu Thr Ser Lys Leu Asp Ala Ala Tyr Lys Leu Ala Tyr Asp Ala Ala
 95 100 105

cag ggc gcc acc ccc gag gcc aag tac gac gcc tac gtc gcc acc ctc 490
 Gln Gly Ala Thr Pro Glu Ala Lys Tyr Asp Ala Tyr Val Ala Thr Leu
 110 115 120

agc gag ggc ctc cgc atc atc gcc ggc acc ctc gag gtc cac gcc gtc 538
 Ser Glu Ala Leu Arg Ile Ile Ala Gly Thr Leu Glu Val His Ala Val
 125 130 135

aag ccc gct gcc gag gag gtc aag cct atc ccc gcc gga gag ctg cag 586
 Lys Pro Ala Ala Glu Glu Val Lys Pro Ile Pro Ala Gly Glu Leu Gln
 140 145 150

atc gtc gac aag att gac gtc gcc ttc aga act gcc gcc acc gcc gcc 634
 Ile Val Asp Lys Ile Asp Val Ala Phe Arg Thr Ala Ala Thr Ala Ala
 155 160 165 170

aac gcc gcc ccc acc aac gac aag ttc acc gta ttc gag acc acc acc ttt Asn Ala Ala Pro Thr Asn Asp Lys Phe Thr Val Phe Glu Thr Thr Phe 175 180 185	682
aac aag gcc atc aag gag agc acg ggc ggc acc tac gag agc tac aag Asn Lys Ala Ile Lys Glu Ser Thr Gly Gly Thr Tyr Glu Ser Tyr Lys 190 195 200	730
ttc att ccc acc ctt gag gcc gcc gtt aag cag gcc tac gcc gcc acc Phe Ile Pro Thr Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala Ala Thr 205 210 215	778
gtc gca tcc gcg ccg gag gtc aag tac gcc gtc ttt gag acc gcg ctg Val Ala Ser Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Thr Ala Leu 220 225 230	826
aaa aag gcg gtc acc gcc atg tcc gag gcc cag aag gaa gcc aag ccc Lys Lys Ala Val Thr Ala Met Ser Glu Ala Gln Lys Glu Ala Lys Pro 235 240 245 250	874
gcc acc gcc acc ccg acc ccc acc gca act gcc gcg gcc gcg gtg gcc Ala Thr Ala Thr Pro Thr Pro Thr Ala Thr Ala Ala Ala Val Ala 255 260 265	922
acc aac gcc ccc gtc gct ggt ggc tac aaa atc tgatcaactc Thr Asn Ala Ala Pro Val Ala Ala Gly Gly Tyr Lys Ile 270 275	971
gctagcaata tacacatcca tcatacacat atagagctgt gtatgtatgt gcatgcacgc 1031 cgtggcgccg cgcaagtttgc tcataatta attcttggtt ttctgtgtt gcatccacga 1091 gcgaccgagc ccgtggatag tcgcattgtgt atgtaatttt ttctgagaaaa tgtgtatatg 1151 taatatataa ttgagtacta aaaaaaaaaa 1181	

<210> 58
<211> 303
<212> PRT
<213> *Lolium perenne*

<400> 58
Met Ala Val Gln Gln Tyr Thr Val Ala Leu Phe Leu Ala Val Ala Ser
-20 -15 -10

Cys Arg Ala Arg Ala Ser Tyr Ala Ala Asp Ala Gly Tyr Ala Pro Ala
-5 -1 1 5

Thr Pro Ala Thr Pro Ala Thr Pro Ala Ala Pro Gly Ala Ala Val Pro
10 15 20

Ala Gly Lys Ala Ala Thr Glu Glu Gln Lys Leu Ile Glu Lys Ile Asn
25 30 35 40

Ala Gly Phe Lys Ala Ala Val Ala Ala Ala Gly Val Pro Pro Gly
45 50 55

Asp Lys Tyr Lys Thr Phe Val Glu Thr Phe Gly Lys Ala Ser Asn Lys
60 65 70

Ala Phe Leu Gly Asp Leu Pro Thr Asn Tyr Ala Asp Val Asn Ser Arg

75

80

85

Ala Gln Leu Thr Ser Lys Leu Asp Ala Ala Tyr Lys Leu Ala Tyr Asp
 90 95 100

Ala Ala Gln Gly Ala Thr Pro Glu Ala Lys Tyr Asp Ala Tyr Val Ala
 105 110 115 120

Thr Leu Ser Glu Ala Leu Arg Ile Ile Ala Gly Thr Leu Glu Val His
 125 130 135

Ala Val Lys Pro Ala Ala Glu Glu Val Lys Pro Ile Pro Ala Gly Glu
 140 145 150

Leu Gln Ile Val Asp Lys Ile Asp Val Ala Phe Arg Thr Ala Ala Thr
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Ala Ala Asn Ala Ala Pro Thr Asn Asp Lys Phe Thr Val Phe Glu Thr
 170 175 180

Thr Phe Asn Lys Ala Ile Lys Glu Ser Thr Gly Gly Thr Tyr Glu Ser
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Tyr Lys Phe Ile Pro Thr Leu Glu Ala Ala Val Lys Gln Ala Tyr Ala
 205 210 215

Ala Thr Val Ala Ser Ala Pro Glu Val Lys Tyr Ala Val Phe Glu Thr
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Ala Leu Lys Lys Ala Val Thr Ala Met Ser Glu Ala Gln Lys Glu Ala
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Val Ala Thr Asn Ala Ala Pro Val Ala Ala Gly Gly Tyr Lys Ile
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Ala Ala Thr Pro
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Ala Thr Thr Asp
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<213> *Lolium perenne*

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Lys Lys Gly Glu
20

<210> 62
<211> 20
<212> PRT
<213> *Lolium perenne*

<400> 62
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1 5 10 15

Ala Gly Glu Leu
20